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S #	Comment	Database	Query String	Delete?
S5690		USPT	6370019	☐
S5689		USPT	5973456	☐
S5688		USPT	6303943	☐
S5687		USPT	6392617	☐
S5686		USPT	((display with diodes and pixels with circuit and (phototransistor or photoresistor or photodiode))and adjust$5) and ag$3	☐
S5685		USPT	(display with diodes and pixels with circuit and (phototransistor or photoresistor or photodiode)) and adjust$5	☐
S5684		USPT	display with diodes and pixels with circuit and (phototransistor or photoresistor or photodiode)	☐
S5683		USPT	display with pixels with circuit and (phototransistor or photoresistor or photodiode)	☐
S5682		USPT	Electroluminesent with display and (phototransistor or photoresistor or photodiode)	☐
S5681		USPT	(5973456) and (photoresistor or photodiode or photosensor)	☐
S5680		USPT	5973456	☐
S5679		USPT	5973456.pn.	☐
S5678		USPT	6057647.pn.	☐
S5677		USPT	6191764.pn.	☐

S5676		USPT	4975691.pn.	☐
S5675		USPT	5973456.pn.	☐
S5674		USPT	6057647.pn.	☐
S5673		USPT	6191764.pn.	☐
S5672		USPT	(((((display with LEDs and driv$ with pixels with circuit)and (photosensor or photoresistor or photodiode))and adjust$5)and correct$4)and ag$3) and electrodes	☐
S5671		USPT	((((display with LEDs and driv$ with pixels with circuit)and (photosensor or photoresistor or photodiode))and adjust$5)and correct$4) and ag$3	☐
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S5669		USPT	(((display with LEDs and driv$ with pixels with circuit)and (photosensor or photoresistor or photodiode))and adjust$5) and correct$4	☐
S5668		USPT	((display with LEDs and driv$ with pixels with circuit)and (photosensor or photoresistor or photodiode)) and adjust$5	☐
S5667		USPT	((display with LEDs and driv$ with pixels with circuit)and (photosensor or photoresistor or photodiode)) and correct$3 with adjust$5	☐
S5666		USPT	(display with LEDs and driv$ with pixels with circuit) and (photosensor or photoresistor or photodiode)	☐
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S5664		USPT	(display with EL with pixels and (photodiode or photoresistor)) and ag$3	☐
S5663		USPT	display with EL with pixels and (photodiode or photoresistor)	☐
S5662		USPT	display with pixel with circuit and driv$ with LED and photosensor	☐
S5661		USPT	display with pixel with circuit and driv$ with LED and photosensor	☐

S5660		USPT	display with pixel with circuit and driv$ with LED and age	☐
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S5651		USPT	(display with pixel with circuit and driv$ with LED and age) and correct$ with adjust$	☐
S5650		USPT	display with pixel with circuit and driv$ with LED and age	☐
S5649		USPT	(((tiles with display)and cover with plate)and black with matrix) and adhesive	☐
S5648		USPT	((tiles with display)and cover with plate) and black with matrix	☐
S5647		USPT	(tiles with display) and cover with plate	☐
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S5645		USPT	(tiled with flat with panel with display) and black with matrix	☐
S5644		USPT	tiled with flat with panel with display	☐
S5643		USPT	tiled with flat with panel with display and black with matrix	☐

S5642		USPT	tiled with flat with panel and black with matrix	☐
S5641		USPT	tiled with flat with panel and two with display with tiles and black with matrix	☐

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S #	Comment	Database	Query String	Delete?
S5640		USPT	(((display with tiles)and black with matrix)and pixels) and OLED	☐
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S5638		USPT	((display with tiles)and black with matrix) and optical with integra$ with plate	☐
S5637		USPT	((display with tiles)and black with matrix) and OIP	☐
S5636		USPT	(display with tiles) and black with matrix	☐
S5635		USPT	display with tiles	☐
S5634		USPT	ali same zamani	☐
S5633		USPT	((((5581243)and LCD)and voltage)and finger) and adjust$3	☐
S5632		USPT	(((5581243)and LCD)and voltage) and finger	☐
S5631		USPT	((5581243)and LCD) and voltage	☐
S5630		USPT	(5581243) and LCD	☐
S5629		USPT	5581243	☐
S5628		USPT	(((display and gray with scale with pixels)and spatial)and temporal) and computer with graphic	☐
S5627		USPT	((display and gray with scale with pixels)and spatial) and temporal	☐
S5626		USPT	(display and gray with scale with pixels) and spatial	☐

S5625		USPT	display and gray with scale with pixels	☐
S5624		USPT	((((display with gray with scale and pixels)and temporal)and spatial)and sampl$3) and computer with graphic	☐
S5623		USPT	(((display with gray with scale and pixels)and temporal)and spatial) and sampl$3	☐
S5622		USPT	((display with gray with scale and pixels)and temporal) and spatial	☐
S5621		USPT	(display with gray with scale and pixels) and temporal	☐
S5620		USPT	(display with gray with scale and pixels) and temoral	☐
S5619		USPT	display with gray with scale and pixels	☐
S5618		USPT	(((((computer with display and gray with scale with pixels)and temporal)and spatial)and threshold)and frame) and tone with images	☐
S5617		USPT	((((computer with display and gray with scale with pixels)and temporal)and spatial)and threshold) and frame	☐
S5616		USPT	(((computer with display and gray with scale with pixels)and temporal)and spatial) and threshold	☐
S5615		USPT	((computer with display and gray with scale with pixels)and temporal) and spatial	☐
S5614		USPT	(computer with display and gray with scale with pixels) and temporal	☐
S5613		USPT	(computer with display and gray with scale with pixels) and temoral	☐
S5612		USPT	computer with display and gray with scale with pixels	☐
S5611		USPT	(((display with gray with pixels)and spatial)and temporal) and unique with colors	☐
S5610		USPT	((display with gray with pixels)and spatial) and temporal	☐
S5609		USPT	((display with gray with pixels)and spatial) and tempral	☐
S5608		USPT	(display with gray with pixels) and spatial	☐
S5607		USPT	(display with gray with pixels) spatial	☐

S5606		USPT	display with gray with pixels	☐
S5605		USPT	(6130665) and threshold	☐
S5604		USPT	6130665	☐
S5603		USPT	5317140	☐
S5602		USPT	(5581243) and threshold	☐
S5601		USPT	5581243	☐
S5600		USPT	display adj simulat$ with keyboard	☐
S5599		USPT	display near4 dispos$ keyboard	☐
S5598		USPT	(palm.as. display near4 touchpad) and simulat$ with keyboard	☐
S5597		USPT	(palm.as. display near4 touchpad) ans simulat$ with keyboard	☐
S5596		USPT	palm.as. display near4 touchpad	☐
S5595		USPT	display adj touchpad and text$	☐
S5594		USPT	display adj touchpad with simulat$5 and keyboard	☐
S5593		USPT	display adj touchpad with simulat$5 with keyboard	☐
S5592		USPT	virtual with keyboard adj display	☐
S5591		USPT	display adj touchapd and simulat$ with keyboard	☐

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L73: Entry 1 of 5 File: USPT Apr 9, 2002

DOCUMENT-IDENTIFIER: US 6370019 B1
TITLE: Sealing of large area display structures

Abstract Text (1):
A plurality of sealing methods may be used either alone or in combination with each other to seal an electronic display structure. The display module includes a first substrate having a plurality of column electrodes. Each of a plurality of portions of a display material are coupled to one of the plurality of column electrodes and to one of a plurality of row electrodes. A pixel seal may be formed over the display material to encapsulate the display material. An area seal may be formed upon the first substrate to encapsulates the row electrodes, the column electrodes, and the portions of display material. A bead seal may be formed around the perimeter of the first substrate to couple it to a second substrate while sealing the internal display material. An edge seal may be formed by a banded structure spanning from the first substrate to the second substrate and extending around the perimeter of the substrates.

Brief Summary Text (2):
The present invention relates to sealing large area display structures, and, more particularly, to sealing tiled OLED display structures.

Brief Summary Text (4):
Electronic display structures are devices that produce patterns of light in response to electrical signals. Different types of display materials may be used for providing the patterns of light. Display structures in which the display materials generate light are known as emissive displays. Emissive displays may be formed using display materials such as organic light emitting diode (OLED) materials. Other types of emissive displays include plasma displays, field emissive displays and electroluminescent displays. Display structures in which the display materials pass or reflect light rather than generate light are known as light-valves. Liquid crystal displays (LCDs) are one form of a light-valve type display structure.

Brief Summary Text (5):
Rather than building a single large electronic display structure (monolithic display), electronic display structures may be mounted adjacent to each other to form tiled displays. A tiled display may function as a single display of a larger size. Tiling of display structures allows for flexibility in size and shape of displays. Tiling is not subject to many of the problems that limit the size of monolithic display technologies. The complexity law does not apply because the basic unit of manufacture in tiled displays may be less complex than large monolithic displays. The size law is not a limiting factor because the basic unit of manufacture is relatively small. Tiled displays obey a scaling-law which is not exponential but linear with display area. This fundamentally different scaling behavior is one advantage of tile technology which results in reduced manufacturing costs.

Brief Summary Text (6):
It is desirable to minimize visibility of the junction between adjacent display structures included in a tiled display. Each individual tile or display structure has a front display surface on which an image is formed. In many cases this surface is protected with a glass cover. Tiles are fastened in a matter for their front glass covers to be adjacent to each other.

exemplary embodiment, each tile extends to the full height or full width of a display 100. These tile sizes are only exemplary. It is contemplated that each tile may include more or fewer pixel forming elements. In addition, it is contemplated that a single display may be formed from tiles having differing numbers of pixel forming elements. For example, a display may have tiles with relatively large numbers of pixel forming elements near the center and tiles having relatively small numbers of pixel forming elements near the edges.

Detailed Description Text (4):
FIG. 2 is a back plan view of a tile 120 suitable for use in the large-area display 100 shown in FIG. 1. As shown in FIG. 2, the tile includes a circuit board 130 upon which is mounted at least one integrated circuit 134. The integrated circuit is connected to the pixel forming elements through conductive traces 132 on the circuit board 130 which are coupled to vias (not shown) that extend through the circuit board 130 to make contact with the row or column electrodes of the display device as described below with reference to FIGS. 3-6B. Alternatively, the conductive traces 132 and their corresponding vias may extend along two edges of the display.

Detailed Description Text (5):
In one exemplary embodiment of the invention, the pixel forming elements are made from a light emitting organic material referred to hereafter as, but not limited to, an organic light emitting diode (OLED) material. The basic light emitting structure consists of a thin organic polymer layer sandwiched between a pair of appropriately selected and patterned electrodes. Current flowing from one electrode to the other electrode causes the organic polymer to emit light. At least one of the electrodes is desirably transparent to the emitted light. Indium tin-oxide (ITO) is the usual material used for this purpose. OLED materials provide high brightness and high efficiency, and are relatively low cost materials.

Detailed Description Text (6):
An exemplary display structure according to the present invention is formed in two parts: a display module and an circuit module. These two parts are made separately and then joined to form a complete tile. The display module consists of a transparent glass layer upon which transparent column electrodes are deposited. The OLED material is deposited onto these layers, as the active (i.e., light emitting) medium. Row electrodes are deposited as the final display layer. Additional layers such as blocking or passivation layers may be present to improve the function or life of the display layers. The transparent electrode is preferably the hole injecting electrode and the other electrode is preferably the electron injecting electrode. The OLED materials between the electrodes are preferably conjugated polymer materials that are applied by thick film processes, however, small molecule materials can alternatively be applied by various thin film deposition techniques. The layers are patterned for electrical access to each row and column at one or more points.

Detailed Description Text (7):
As an alternative to the OLED materials, the pixel forming elements of the tiles may be any of a number of emissive devices such as electroluminescent elements, light emitting diodes, field emissive elements, plasma elements or cathodoluminescent elements.

Detailed Description Text (8):
The circuit module is formed by punching or drilling vias through the circuit board and then printing or otherwise depositing the conductive traces on the circuit board. The conductive ink or paste used to form the conductive traces may also fill the vias. The vias make contact with the row and column electrodes of the display module when the circuit module and the display module are joined to form a tile.

Detailed Description Text (9):
One exemplary tile structure consists of a multilayer ceramic circuit board 130 that serves as a substrate upon which: the display material is mounted on the viewer side while the electronics 134 (active and passive) for drive or other functions are mounted mostly on the back side. Conductor elements 132 are printed on the individual layers to provide interconnections between the electronics and the display material, vias interconnect the conductors in different layers; and

connectors are provided on the back surface to connect to external power and signal sources. The tile structure may also have a structural layer(s) such as a high softening point metal or insulator to provide freedom from distortion during the processing of the ceramic materials, and/or thermal management during the operation of the display. The tile structure also contains a transparent layer (e.g. float glass) on the viewer surface to protect or contain the display material. A back panel structure may be provided to mount the individual tiles and to provide electrical connection to the power and drive signals needed by each individual tile structure.

Detailed Description Text (13):
A core layer may also be included in this structure. This layer typically has a higher softening point than the ceramic materials and serves as a substrate for the assembly and processing of the ceramic material. The core layer acts to: eliminate horizontal shrinkage; establish a single coefficient of expansion for the multilayer system, and provide mechanical ruggedness to the multilayer assembly. If the layer is a good electrical conductor it may also provide RF shielding. If the layer is also a good thermal conductor, it contributes to the thermal management of the display. Conductive layers, however, present a special problem for via connections. Via connections through metal layers can be fabricated in several ways: filling the periphery of the hole with an insulating material before putting a metal conductor through the middle, or by putting the conductor only through the middle leaving space separating the conductor from the conductive metal core.

Detailed Description Text (14):
The electronics which form the image processing and pixel driving circuitry are mounted on the layers. Electronics are used in the broadest sense to include both active and passive, and both discrete devices mounted on the layers and devices formed in place by processes such as those now used to make active matrix circuits for displays on various high temperature substrates. While these electronics can be placed anywhere, the most convenient location is the back surface. This permits standard assembly and attachment equipment and processes to be used. In addition, the placing of active or passive devices on the interviewing layers or viewer surface permits greater flexibility in the system design.

Detailed Description Text (16):
The edges of the tiles are desirably carefully formed to ensure that the tiled display has no visible seams between the tiles. One criterion for the tiles is that the spacing between the pixels separated by the tile seam is the same as the spacing of pixels on the tile. To satisfy this criterion, the tile edges are desirably dimensionally precise. Furthermore, if the edges are also used for conductors or if mullions are used to join adjacent tiles, it is desirable to account for the thickness of these conductors or mullions in the design and placement of the tiles.

Detailed Description Text (17):
A backpanel may be provided for the physical mounting and interconnection of the tiles to form a display. The mounting of the tiles is done such that there is a continuity in the pixel spacing over the display. The shape of the tiles is most typically square or rectangular, however the shape can be any shape that can be tiled to form a larger display. Also, the tile is typically flat, but may be curved along one or both dimensions to form curved or domed displays. Curved or domed displays can also be made using flat tiles mounted on a curved or domed backpanel. Tiles may be attached to the backpanel either by permanent connection such as soldering or using connectors which allow the tiles to be plugged into the backpanel. This latter method permits the repair and replacement of individual tiles. Different types of tiles may be attached to different areas of the backpanel-for example, higher resolution areas may be placed in the center or other areas of the large display. In addition, different sized or different shaped tiles may be combined in a single display. For example, tiles near the edges of a large panel may be larger and have a lesser pixel density than tiles near the center of the panel.

Detailed Description Text (19):
The electrical structure of the backpanel provides for the distribution of power and signals to the tiles, and the electrical structure of the tiles provide for the

addressing of the display pixels. Both levels of structure are described. The information needs of a tiled display increase with the size of the display as measured in total number of pixels. A greater number of pixels on a tile translates to greater amounts of data stored on the tile and greater rates of information transfer.

Detailed Description Text (22):
One advantage of the tiled display is that the scan electronics can be internal to the tile and the scan rate of any one tile is the same for a small display or for a large display. This ensures that the brightness and gray scale of the display do not degrade with increasing size. The tiled displays described in detail below have an architecture which connects the signals to the pixels without interrupting the continuity of the pixel spacing, even at the edges of the tiles. The disclosed tiled displays may also have signal processing circuitry which extracts the signal information for that tile from a broadcast information signal and transforms the extracted information into the signals needed to address that tile.

Detailed Description Text (23):
In general, the front-to-back connections include one for each row of pixels and one for each column of pixels on the tile. Tiled displays have relatively few pixels so the number of interconnects per tile is relatively small and the yield on individual tiles can be high. This is a significant advantage of tiled displays when compared to fabrication of large displays from single substrates. In general, the yield is a function of the number of pixels in the display device.

Detailed Description Text (24):
The final connection to the row or column is made with a via that extends from the back surface of the tile. This via has a diameter less than the spacing of a pixel. To accomplish this, the portions of the vias in the display layer(s) may be made smaller than the vias through the other intervening layers, and, as described below, the connections may be staggered over the area of the tile to provide maximum spacing between the wider interconnects. These connections are the final link in the distribution of the display signals to the pixels.

Detailed Description Text (25):
FIG. 3 is an exploded perspective diagram which shows an exemplary display structure. The tile structure is formed in two parts: the display module and the circuit module.

Detailed Description Text (26):
The display module includes a transparent front plate 320 which may be, for example, a float glass plate. Transparent column electrodes 322 are formed on the front plate 320 by depositing thin bands of a transparent conductor, such as indium-tin oxide (ITO), using well known processes. The red, green and blue OLED materials or other display materials 324 and 326 are deposited on top of the column electrodes to define the active area of the pixel. As described below with reference to FIG. 5, it is desirable for the display materials 324 and 326 (shown in FIG. 3) to occupy only a portion (e.g. about 25 percent) of the pixel area. An electron injecting electrode (e.g. calcium) may then be formed upon the OLED material. The row electrodes 328 are formed on top of the display materials 324 and 326. The row electrodes 328 may be formed, for example, from polysilicon or from a metal such as aluminum using standard deposition techniques. An insulating layer 330 is formed on top of the row electrodes 328. The exemplary insulating layer 330 may be formed from any of a number of insulating materials. To protect the display materials, the insulating layer 330 is desirably formed using low-temperature processes. Exemplary materials include Polyimide or other low-temperature inorganic materials. The insulating layer 330 may be applied using thick film or thin film deposition techniques. The insulating layer 330 includes a plurality of openings 331 aligned with the row electrodes 328 or column electrodes 322.

Detailed Description Text (28):
The circuit module 312 includes image processing and display driving circuitry 134 (see FIG. 2); a circuit board 130, which may be, for example, a thin sheet of alumina (Al.sub.2 O.sub.3); deposited electrical conductors 132; and connecting pads 334 vias 338 which electrically connect the conductors 132 to the connecting pads

334 through the circuit board 130. The conductors 132, vias 338 and connecting pads 334 may all be formed using thick film deposition processes to apply a metallic ink or paste. The connecting pads 334 may also be formed from vapor-deposited aluminum. There is a one-to-one relationship between the connecting pads 334 of the circuit module and the connecting plates 322 of the display module. In an exemplary embodiment of the invention, described below with regard to FIG. 7, the connecting pads 334 and the connecting plates 332 (shown in FIG. 3) are electrically connected by applying an anisotropically conductive adhesive between the display module and the circuit module. The combined display module and circuit module forms a tile 120.

Detailed Description Text (36):
FIG. 7 is a cross-sectional view of an electronic display structure (tile) 700 illustrating an exemplary embodiment of area sealing and an exemplary embodiment of edge sealing according to the present invention. Although the exemplary sealing mechanisms are described in FIG. 7 shown with regard to a bottom emitting OLED display, as known to those skilled in the art, the teachings of the present invention are generally applicable to other display technologies.

Detailed Description Text (37):
The tile 700 includes a display module 704 and a circuit module 702, each composed of multiple layers. The display module 704 consists of a glass substrate 706 on which are deposited active display materials 708 including transparent hole injecting electrodes (e.g. ITO), OLED material(s), electron injecting electrodes (e.g. calcium), and contact layer(s) 710. Light is emitted by the OLED material(s) and exits the display structure 700 through the transparent electrode and glass substrate 706 (this is termed a bottom emitter structure because the light exits through the substrate for the OLED material). The circuit module 702 consists of an insulating substrate 712 with contact layer(s) 714 that match the contact layers 710 of the display module 704, electrical vias 716 that connect these contacts 714 to conductors on the opposite surface of the insulating substrate 712 and to an integrated circuit(s) 134.

Detailed Description Text (38):
The circuit module 702 simultaneously functions as a barrier layer for sealing the display structure 700, a back substrate for the display structure 700, and as an electrical circuit board. The circuit module 702 and the display module 704 form a display structure 700 by being joined together.

Detailed Description Text (45):
For a display structure as shown in FIG. 3, the row and column electrodes are coupled through an insulating layer 330 to connecting plates 332. The signal lines provided by the integrated circuit 134 are coupled through vias to connecting pads 334. The display module 310 and circuit module 312 of FIG. 3 may be coupled using an anisotropically conductive structure (ACS) according to the present invention.

Detailed Description Text (50):
The display structure 700 in FIG. 7 also includes an edge seal or band seal 716. The band seal 716 spans from the display module to the circuit module and extends around the outer perimeter of the circuit and display modules. The display structure 700 also includes a masking layer formed on an end of the band seal wherein the masking layer acts to hide the band seal when the display structure is viewed through the glass substrate 706. FIG. 7A illustrates adjacent electronic display structures 700 each having a band seal 716 and a masking layer 718 formed upon their glass substrates 706 to hide the band seals 716. In an exemplary embodiment, the band seal 716 is comprised of one of metal, glass, and polymer (e.g. Kapton).

Detailed Description Text (51):
FIG. 8 is a cross sectional view of an electronic display structure 800 having a bead seal 802 according to the present invention. The bead seal 802 is formed around the perimeter of the display structure 800 between the circuit module and the display module. In an exemplary embodiment, a masking layer 804 is formed opposite the circuit module at least on the bead seal or on the front or back surfaces of the glass substrate 806 of the display module.

Detailed Description Text (52):
The masking layer 804 acts to hide the bead seal when the display structure is viewed from the front surface 808 of the substrate. The masking layer 804 shown in FIG. 8 is formed upon the front surface 808 of the glass substrate 806. In an exemplary embodiment, the thickness of the glass substrate 806 is less than the gap between adjacent pixels. In an exemplary embodiment, the bead seal 802 has a width less than one-half of the gap between adjacent pixels of the display structure 800 so the visibility of the seam between adjacent display structures 800 will be minimized. In an exemplary embodiment, the bead seal is black.

Detailed Description Text (54):
As shown in FIG. 9, in combination with the sealing methods described above, an entire display including tiles 102 may be sealed using a display seal. The display seal includes a front plate 902, a back plate 904 and a seal 906 therebetween. The tiles 102 are oriented so the front glass of the tiles 902 are adjacent the front plate 902 of the display seal. According to the present invention, each tile may include circuitry to provide signals to drive its respective pixels. Thus, the display seal need not accommodate any circuitry aside from providing a signal path from tiles within the display seal to a signal source outside the display seal.

CLAIMS:

1. An electronic display structure comprising:

a display module including:

a first substrate having a plurality of column electrodes;

a plurality of row electrodes;

a plurality of portions of a display material, each coupled to one of the plurality of row electrodes and to one of the plurality of column electrodes; and

an area seal formed upon the first substrate and encapsulating the row electrodes, the column electrodes, and the portions of display material.

11. An electronic display structure according to claim 8 further comprising an insulating pad formed upon the first substrate, the plurality of column electrodes, the plurality of row electrodes, and the plurality of portions of the display material, and including apertures for coupling each of the plurality of row and column electrodes to its respective signal line.

18. An electronic display structure comprising:

a display module including a substrate with a first surface and a second surface, the display module having an outer portion, and an inner portion, the inner portion including:

a plurality of column electrodes formed on the first surface of the substrate,

a plurality of row electrodes, and

a plurality of portions of a display material, each controlled by one of the plurality of row electrodes and by one of the plurality of column electrodes;

a circuit module having an outer area and an inner area, the inner area including a plurality of signal lines each corresponding to one of the plurality of row and column electrodes;

a bead seal having a first side coupled to the outer area of the circuit module and a second side coupled to the outer area of the display module; and

a masking layer formed opposite the circuit module on one of the bead seal, the first surface of the substrate, and the second surface of the substrate, wherein the masking layer acts to hide the bead seal when the display structure is viewed from

the first surface of the substrate.

19. An electronic display structure according to claim 18 wherein the circuit module has a back side including an integrated circuit and the row electrodes and column electrodes are coupled to the integrated circuit through electronic display structure.

20. An electronic display structure according to claim 18 wherein each of the plurality of portions of the display material corresponds to a pixel and a gap is formed between adjacent pixels on the substrate and the bead seal has a width less than one-half of the gap between adjacent pixels.

23. An electronic display structure comprising:

a display module including a substrate with a first surface and a second surface, the display module having an outer portion, and an inner portion, the inner portion including:

a plurality of column electrodes formed on the first surface of the substrate,

a plurality of row electrodes, and

a plurality of portions of a display material, each controlled by one of the plurality of row electrodes and by one of the plurality of column electrodes;

a circuit module having an outer area and an inner area, the inner area including a plurality of signal lines each corresponding to one of the plurality of row and column electrodes;

a substantially uniform bead seal having a first side coupled to the outer area of the circuit module and a second side coupled to the outer area of the display module.

26. An electronic display structure according to claim 24 wherein the circuit module has a back side including an integrated circuit and the row electrodes and column electrodes are coupled to the integrated circuit through electronic display structure.

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1. Document ID: US 6370019 B1

L73: Entry 1 of 5 File: USPT Apr 9, 2002

US-PAT-NO: 6370019
DOCUMENT-IDENTIFIER: US 6370019 B1

TITLE: Sealing of large area display structures

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

2. Document ID: US 6274978 B1

L73: Entry 2 of 5 File: USPT Aug 14, 2001

US-PAT-NO: 6274978
DOCUMENT-IDENTIFIER: US 6274978 B1

TITLE: Fiber-based flat panel display

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

3. Document ID: US 6259846 B1

L73: Entry 3 of 5 File: USPT Jul 10, 2001

US-PAT-NO: 6259846
DOCUMENT-IDENTIFIER: US 6259846 B1

TITLE: Light-emitting fiber, as for a display

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

4. Document ID: US 6259838 B1

L73: Entry 4 of 5 File: USPT Jul 10, 2001

US-PAT-NO: 6259838
DOCUMENT-IDENTIFIER: US 6259838 B1

TITLE: Linearly-addressed light-emitting fiber, and flat panel display employing same

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

☐ 5. Document ID: US 6228228 B1

L73: Entry 5 of 5 File: USPT May 8, 2001

US-PAT-NO: 6228228
DOCUMENT-IDENTIFIER: US 6228228 B1

TITLE: Method of making a light-emitting fiber

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

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Terms	Documents
L72 and integrat$ with circuit	5

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Terms	Documents
L72 and integrat$ with circuit	5

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IBM Technical Disclosure Bulletins

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DB=USPT; PLUR=YES; OP=OR			
L73	L72 and integrat$ with circuit	5	L73
L72	L71 and OLED	5	L72
L71	display with tile$ and substrate	237	L71
L70	L64 and CMOS	10	L70
L69	L66 and CMOS	2	L69
L68	L67 and CMOS	1	L68
L67	L66 and trigger	17	L67
L66	L64 and measure$	48	L66
L65	L64 and charge/discharge	1	L65
L64	L63 and capacitor	75	L64
L63	L62 and wiper	142	L63
L62	potentiometer with microprocessor	871	L62

Brief Summary Text (7):
Display structures are typically fabricated by coupling top and bottom substrates together. Because many display materials require that a vacuum, moisture or hermetic seal be maintained around the pixels of the display structure, it is desirable that the mechanical junction between top and bottom substrates also serve as a sealing mechanism. The integrity of a sealing mechanism may be critical for predictable device performance and to ensure a predictable device lifetime.

Brief Summary Text (8):
The patterns of light formed by display structures in response to electrical signals are formed by individual display elements or pixels. To independently control the light corresponding to each pixel, each pixel may be addressed using electrical signals. For a display structure having top and bottom substrates, it may be desirable to couple these electrical signals between the substrates. It is often difficult to couple these signals to the display structure due to the large number of signals and the desire to simultaneously seal the display material of the display structure.

Brief Summary Text (10):
To overcome the shortcomings of conventional methods of sealing tiled display structures, a new method of sealing tiled display structures is provided.

Brief Summary Text (12):
The present invention provides an electronic display structure comprising a display module and an area seal. The display module includes a first substrate having a plurality of column electrodes. Each of a plurality of portions of a display material are coupled to one of the plurality of column electrodes and to one of a plurality of row electrodes. The area seal is formed upon the first substrate and encapsulates the row electrodes, the column electrodes, and the portions of display material.

Brief Summary Text (20):
According to another aspect of the present invention, a bead seal couples an outer area of the display module to an outer area of the circuit module and a masking layer acts to hide the bead seal when the display structure is viewed from the first surface of the substrate.

Brief Summary Text (21):
According to another aspect of the present invention, the bead seal occupies an area less than one-half of the gap between pixels to minimize the visual perception of seams between adjacent display tiles.

Drawing Description Text (3):
FIG. 1 is a front plan drawing of a large area display device from which two tiles have been removed;

Drawing Description Text (4):
FIG. 2 is a back plan view of a tile suitable for use in the large area display shown in FIG. 1;

Detailed Description Text (2):
Referring now to the drawing, in which like reference numerals refer to like elements throughout, FIG. 1 is a front plan view of a partially assembled large-area display 100 according to the present invention. The display 100 is a tiled display in which emissive or reflective elements, on which the image pixels are formed, are built as relatively small arrays on tiles 120 and assembled into a frame to produce the large-area display having a large number of pixel forming elements. The display shown in FIG. 1 is missing two tiles 122 and 124. These tiles are inserted into the positions 102 and 104 to complete the display.

Detailed Description Text (3):
Although the display 100 is shown as being formed from tiles having 16 pixel forming elements in a four by four array, it is contemplated that each tile may include many more pixels. In one exemplary embodiment of the invention, described below, each tile includes 896 pixel forming elements arranged as a 32 by 28 matrix. In another

L26	L25 and finger with position	134	L26
L25	L24 and pressure with sensitive	817	L25
L24	"palm".as. (touchpanel or LCD or display) with (touchpad or keyboard)	38104	L24
L23	L22 and single with cover	250	L23
L22	((345/$3).ccls.) keyless with mouse	30362	L22
L21	((345/$3).ccls.) and mouse with keyless	0	L21
L20	((345/163)!.CCLS.) and mouse with keyless	0	L20
L19	((345/166)!.CCLS.) and mouse with keyless	0	L19
L18	L17 and substrate	10	L18
L17	L16 and converter	83	L17
L16	((345/163)!.CCLS.) keyless with mouse	531	L16
L15	L14 and wheel	162	L15
L14	((345/163)!.CCLS.) and mouse	508	L14
L13	L10 and cover	166	L13
L12	L10 and single with cover	5	L12
L11	L10 and ("key-free")	0	L11
L10	"microsoft".as. and mouse	1086	L10
L9	"micrsooft".as. and mouse	0	L9
L8	L7 and period with extinct$	1	L8
L7	L6 and LCD	19	L7
L6	((345/$3).ccls.) and (RGB or red, green, blue) and subfield	108	L6
L5	((345/102)!.CCLS.) and (RGB or red, green, blue) and subfield	1	L5
L4	((345/102)!.CCLS.) and (RGB or red, green, blue) and sbufield	0	L4
L3	((345/102)!.CCLS.) and (RGB or red, green, blue) with period and sufield	0	L3
L2	((345/102)!.CCLS.) and RGB with period and sufield	0	L2
L1	((345/102)!.CCLS.) and RGB with period with frame and sufield	0	L1

END OF SEARCH HISTORY

L61	5828364.pn.	1	L61
L60	L59 and mouse	14	L60
L59	ali same zamani	60	L59
L58	L57 and keys	7	L58
L57	L56 and spring	29	L57
L56	one with piece with mouse	76	L56
L55	L54 and spring	29	L55
L54	mouse with shell	115	L54
L53	mouse with shell and no with keys	4	L53
L52	L51 and converter	6	L52
L51	l50 and optical	28	L51
L50	mouse with one with (cover or shell)	84	L50
L49	mouse with one with pieace	0	L49
L48	mouse with one with peace	0	L48
L47	mouse with keyless	1	L47
L46	mouse with one with cover and (without with key or keyless)	4	L46
L45	L43 and pressure with sensitive	0	L45
L44	L43 and pressure with sensitive	0	L44
L43	L42 and threshold	59	L43
L42	"palm".as. (touchpanel or styles or LCD or display) with (dispos$ or superpos$) with (touchpad or keyboard)	662	L42
L41	L39 and pressure with sensitive	118	L41
L40	L39 and presure with sensitive	0	L40
L39	"sony".as. (touchpanel or styles or LCD or display) with (dispos$ or superpos$) with (touchpad or keyboard)	17308	L39
L38	L37 and pressure with sensitive	118	L38
L37	"sony".as. (LCD or display) with (dispos$ or superpos$) with (touchpad or keyboard)	17307	L37
L36	"sony".as. (LCD or display) with (dispos$ or superpos$)with(touchpad or keyboard)	17307	L36
L35	L34 and threshold	59	L35
L34	"palm".as. (LCD or display) with (dispos$ or superpos$)with(touchpad or keyboard)	661	L34
L33	L31 and threshold	0	L33
L32	L31 and threshold	0	L32
L31	L30 and (handheld)	21	L31
L30	L29 and LCD	165	L30
L29	"palm".as. (touchpanel or LCD or display) with (dispos$ or superpos$)with(touchpad or keyboard)	661	L29
L28	L27 and text	14	L28
L27	L26 and threshold	40	L27